

calcium carbonate there is a fairly definite temperature, $470^{\circ} \pm 3^{\circ}$ C., at which arragonite passes into calcite, but the change in this case is not reversible, and even at low temperatures calcite appears to be the stable, and arragonite the labile, form.

MESSRS. F. DARTON AND CO., Clerkenwell Optical Works, have sent us a copy of the latest issue of their list of electrical novelties. The catalogue may be commended to the attention of those who are interested in the application of electricity to domestic, medical, and other purposes.

MESSRS. F. E. BECKER AND CO., Hatton Wall, London, have submitted for our inspection a specimen of their "Nivoc" patent stencil. The stencil is designed to assist young students of science in making drawings of apparatus, and will be found of service for this purpose. At the same time, the adoption of stencils of this kind will deprive pupils of the practice necessary to enable them to develop the power of rapid, unaided sketching which, as Huxley long ago pointed out, is essential to the student of science.

A SECOND edition of Prof. A. E. H. Love's "Theoretical Mechanics. An Introductory Treatise on the Principles of Dynamics," has been published by the Cambridge University Press. The first edition of the work was reviewed at length in our issue for June 23, 1898 (vol. lviii., p. 169). It is only necessary to state that the changes which have been made in the present edition are, for the most part, of the nature of a re-arrangement of the order of the material. The consequence is that the theory has been presented in a less abstract fashion, and long preliminary discussions have been avoided.

A SECOND edition of the late Prof. P. Drude's "Lehrbuch der Optik" has just been published by Mr. S. Hirzel, Leipzig. The text has been revised, and forty pages have been added to the book in order to bring under consideration the work in magneto-optics and related subjects done since the original edition appeared six years ago (see NATURE, October 18, 1900, vol. lxii., p. 595). The manuscript of the new edition was completed and partly printed before Prof. Drude's lamented death, but Mr. F. Kiebitz has seen it through the press. The work has now an index.

THE twelfth volume of the new series of the *Reliquary and Illustrated Archaeologist* has now been published by Messrs. Bemrose and Sons, Ltd. It consists of the four quarterly numbers issued during the present year. The first of these parts includes a contribution by Mr. J. Patrick to the series of papers dealing with the sculptured caves of East Wemyss, in which the Factor's Cave is described. The April number contains an illustrated article by Mr. R. Quick entitled "Notes on the Evolution of the Means of Transport by Land and Water." The most primitive means of transport by land is stated to be by means of tent poles and skin tents, but it would be hard to prove that this method was primitive either in time or in culture, especially as the author credits "prehistoric man" with "a conveyance of logs of wood bound together by withes and carried in the hand, somewhat in the manner of the Chinese sedan chair." The July number includes two interesting papers by Mr. J. Charles Wall on Lastingham; one, "Pure Norman," describes the unique example of a pure Norman crypt, free from any intrusions of later architecture, and the other, "Lastingham Relics," tells of some of the treasures, mainly the

sculptured stones, to be found in the crypt. The concluding part is perhaps of less interest to the man of science. It contains, with other papers, an account by Charlotte Mason of the characteristics of Blythburgh and its church, and a short paper by Sophia Beale on the evolution of the ancient lamp.

OUR ASTRONOMICAL COLUMN

THE CALORIFIC RADIATION OF THE SUN.—Further results relating to the intensity of the solar calorific emissions are published in No. 17 of the *Comptes rendus* by MM. Millochau and Féry. Using the instrument described in their former note, and considering only the centre of the solar disc, they obtained measures at Meudon (altitude=150 m.), Chamonix (altitude=1030 m.), and the summit of Mont Blanc (altitude=4810 m.). Accepting the emissive power as being equal to unity, these gave 4820° , 5140° , and 5560° , respectively, when standardised by the electric furnace. All these measures were obtained when the sun was near the zenith, and the observers give a table showing the hourly variation of the apparent temperature from 8 a.m. to 6 p.m.

The maximum observed temperature on the summit of Mont Blanc was 5590° absolute, and, roughly correcting for the atmospheric absorption, this gives the final result as 5620° absolute.

THE SYSTEM OF 61 CYGNI.—In No. 4128 of the *Astronomische Nachrichten* Prof. Barnard discusses a series of measures of the double star 61 Cygni which he made on 144 nights between August 7, 1900, and November 12, 1904. These measures were undertaken for the purpose of testing Dr. Wilsing's hypothesis as to the existence of an unknown dark body in the system of this star. This observer found that his photographic measures indicated an apparent periodic oscillation, in the distance between the two components, of about $0''.3$, taking place in twenty-two months. If this oscillation were real its effect on the measures of the parallax of this star would be considerable, and might account for the large differences already obtained by various observers.

Prof. Barnard's results do not, however, confirm the hypothesis, although the observations extended over twice the interval of Dr. Wilsing's supposed period. The distance between the two components does not appear to be affected by any periodical variation, and only in one case does the distance difference exceed the mean by so much as one-tenth of a second of arc. It seems evident, therefore, that some cause other than that of a disturbing body will have to be found for the differences observed by Dr. Wilsing.

THE CAPE OBSERVATORY.—In his report of the work performed at the Cape Observatory during the year 1905, Sir David Gill states that the two underground azimuth-marks of the new transit circle are now working satisfactorily, and that the observations with this instrument show a systematic diurnal variation of azimuth amounting to about ± 0.02 second. When the observations of circumpolar stars are sufficiently discussed to determine the absolute variation of the azimuth-marks, it seems possible that these may prove sufficiently stable to permit of the determination of the horizontal component of Prof. Chandler's change of latitude. The automatic arrangements for regulating the pressure and temperature inside the sidereal clock-case are now perfect, the temperature never varying from 75° F. by more than one-tenth of a degree. The work for the Astrographic Chart and Catalogue was nearing completion at the end of 1905, and during that year 148 catalogue plates, containing 1944 standard and 112,086 other star images, were measured.

MINOR PLANETS.—In No. 4128 of the *Astronomische Nachrichten* Dr. Bauschinger publishes the numbers which have been allotted to the recently-discovered minor planets. From this list we see that the total number, up to June 21, 1906, was 601, and that thirty-two new ones were discovered between July 30, 1905, and that date, mostly at the Heidelberg Observatory. The same publication also contains a list of the names allotted to various minor planets between No. 459 and No. 562.

DESIGNATIONS OF NEWLY-DISCOVERED VARIABLE STARS.—The permanent designations allotted to recently-discovered variable stars by the Commission of the A.G. Catalogue of Variable Stars are published in No. 4127 of the *Astronomische Nachrichten*. The table given also shows the position for 1900, the precession corrections, and the range of magnitude of each object.

THE BOLOGNA OBSERVATORY.—We have received from the director of the Bologna Observatory, Prof. Rajna, an interesting account of the history of the observatory, of its present condition, and of a projected re-establishment on a new site. Founded in the year 1712, the observatory was a prominent one in the astronomical world at that time, but at the end of the eighteenth century a decadence set in, and, with the exception of the period 1855–1865, when Respighi was director, has continued ever since. The instruments are out of date or incomplete, and the only work prosecuted is the computation of ephemerides. Prof. Rajna has, however, elaborated a scheme whereby the observatory might be installed in an existing building and re-fitted with new instruments at an estimated cost of about 147,000 lire (about 5800l.), and to this end appeals for help in carrying out his project.

RESEARCH IN INDIA.¹

IT must be confessed that the Englishman at home takes little interest, other than political, in his Indian Empire. The fact has been noticed by the Hindus themselves. We do not compare favourably with the Dutch, for example, who are keenly interested in every aspect of their possessions in the East. Yet the scientific importance of India (a big slice of the globe comes under the name) is in many ways unique, and to the sympathetic and imaginative mind its varied yet homogeneous population supplies an inexhaustible fund of suggestion for the study of man. Much has been done, sporadically, since the days of Sir William Jones, but scientific research in India has never been adequately organised. The antiquities and languages of India have received comprehensive attention, but the most remarkable religion of the world has depths still unfathomed; the institutions and social habits of the people are not yet fully understood; important documents, like the Tantras, still remain untranslated, though the task is a simple one, and its results would be of great value. Meanwhile the Hindus are the people who, thousands of years ago, said—as some think—the last word on philosophy. It is curious to note how frequently the European thinker ends his course in some system long ago familiar to the Hindu. "The immobility of the East," so strangely contrasting with our feverish civilisation, may perhaps contain the solution of a problem which still perplexes us—how to live.

The memoirs here noticed represent a varied range of research in biology, ethnology, the history of science, palæography, and religion, in which Englishmen, Mohammedans, Hindus, and a Belgian Jesuit have taken part. Mr. G. Muhammad gives new data on the customs and traditions of the people of Gilgit, a dependency of Kashmir, where polo is the national game and a noble family exists claiming descent from Alexander the Great. These people, as others of the Hindu Kush, possess a harvest ceremonial of great interest, and the present paper gives some well-arranged additions to Sir George Robertson's account of the subject.

¹ *Memoirs of the Asiatic Society of Bengal*, 1905-6. Vol. i. No. 1. pp. 1-23, "On certain Tibetan Scrolls and Images lately brought from Gyantse," by S. C. Vidyābhūṣaṇa. No. 2, pp. 25-42, "Sal-ammoniac: a Study in Primitive Chemistry," by H. E. Stapleton. No. 3, pp. 43-15, "The Similarity of the Tibetan to the Kashgar-Brahmi Alphabet," by A. H. Francke (with 5 plates). No. 4, pp. 47-70, "Alchemical Equipment in the Eleventh Century, A.D.," by H. E. Stapleton and R. F. Azo (with 1 plate). No. 5, pp. 73-84, "Malaysian Barnacles in the Indian Museum, with a List of the Indian Pedunculata," by N. Annandale (with 1 plate). No. 6, pp. 85-91, "Ashrafpur Copper-plate Grants of Devakhaḍga," by G. M. Laskar (with 1 plate). No. 7, pp. 93-127, "Festivals and Folklore of Gilgit," by Ghulam Muhammad. No. 8, pp. 93-119, "Notes on the Bhotias of Almora and British Garhwal," by C. A. Sherring. No. 9, pp. 121-181, "Religion and Customs of the Uraons," by P. Dehon, S.J. (Calcutta, 1905 [1-5, 7]: 1906 [6, 8, 9]). (Price:—1, 2s. 3d.; 2, 1s. 6d.; 3, 2s. 10d.; 4, 2s. 3d.; 5, 2s. 3d.; 6, 10d.; 7, 2s. 10d.; 8, 2s.; 9, 2s. 10d.)

The paper on the Bhotias tells us a good deal about a little-known people. Their culture is partly Hindu and partly Tibetan. With the exception of the Jethoras, they are tradesmen by instinct and education. The system of "house-connections" was their business method, until the treaty of Lhasa in 1904 changed the conditions of trade. The national institution of the *rambang*, or village club, presents features of importance for the study of similar customs. In their marriage ceremonies there is a mock capture of the bride. The distinction between children and adults is marked, in language and custom, by the permanent teeth. After the burning of a corpse a bone is taken from the pyre and placed with much ceremony in what are known as "ghost-boots," while advice is given to the departed spirit as to the road he has to take.

The most considerable of these papers is that by the late Father Dehon, S.J., a missionary who knew the Uraons well. He might have compiled a valuable monograph on the people with whom he had worked for so many years had he lived. His notes reveal a liberal and scientific mind, and contain much new and already elaborated information to supplement Dalton and Risley. The Uraons or Oraons are one of the most interesting branches of the so-called Dravidian race. One or two details will show what the reader may expect to find in the paper. More than evil spirits they fear the evil eye and the "evil mouth," and the *palkhausna* rite to obviate the evil results of envy is in constant use. Father Dehon is particularly complete and lucid in his account of their theistic and spiritualistic beliefs. Each dead man has two shades, a light and a heavy; the latter goes to *Markha* (heaven), the former remains among the living. Their ancestor-worship is full of pathos and affection. Human sacrifice, the author assures us, still occurs, in spite of the vigilance of the authorities. Waifs and strays, tramps and strangers, are the victims, and the object of the sacrifice is to promote the success of the crops. The susceptibility of these natives to hypnotic influence is remarkable, and considerable use of this peculiarity is made in their religious practices. We are even told that "in a Mission School in Chota Nagpur, every time the boys sang and beat the *tomtom* together they constantly fell into trances and would run like rats along the rafters of the school, and do all kinds of wonderful things." In the *dhumkuria*, or dormitory, in which the village boys sleep, there is an organised system of bullying, the object of which is to make them hardy members of society. What would our educationists say to this? The *panch* is the whole community represented by the older members, and forms their republican chamber. There is a proverb, repeated on all important occasions, "above God, below the *panch*."

Two papers owe their material to the late Tibetan expedition. Some Tibetan scrolls from Gyantse contain interesting accounts of Buddhist saints, but do not seem to add anything new. Mr. Francke argues that the beautiful Tibetan script is derived from the Kashgar Brahmi characters. To one whose acquaintance with the ordinary Devanāgarī Sanskrit alphabet is but recent, the author seems to make out a good case for his theory.

Mr. Stapleton's study in primitive chemistry is extremely interesting. He traces the connection between savage magic and mediæval alchemy, with special reference to the process of obtaining sal-ammoniac from burnt hair. His other paper, with Mr. Azo, deals with the materials and apparatus of alchemy in the eleventh century, and is worth the attention of chemists who are interested in the origins of their science. It is chiefly written round an Arabic book. *Inter alia*, he shows that importance was attached to weights in chemical experiments 700 years before the time of Black and Lavoisier.

Marine zoologists will find new examples of Pedunculata described and illustrated in Mr. Annandale's paper. The Ashrafpur copper plates reveal the existence of a hitherto unknown line of Buddhist kings in east Bengal.

There are some good plates in the volume. The press-correcting is at times annoying; there are too many misprints, and it is confusing to find two papers each commencing on p. 93, one ending on p. 119, the other on p. 127, while the succeeding paper begins on p. 121.

A. ERNEST CRAWLEY.